Early Journal Content on JSTOR, Free to Anyone in the World

This article is one of nearly 500,000 scholarly works digitized and made freely available to everyone in the world by JSTOR.

Known as the Early Journal Content, this set of works include research articles, news, letters, and other writings published in more than 200 of the oldest leading academic journals. The works date from the mid-seventeenth to the early twentieth centuries.

We encourage people to read and share the Early Journal Content openly and to tell others that this resource exists. People may post this content online or redistribute in any way for non-commercial purposes.

Read more about Early Journal Content at http://about.jstor.org/participate-jstor/individuals/early-journal-content.

JSTOR is a digital library of academic journals, books, and primary source objects. JSTOR helps people discover, use, and build upon a wide range of content through a powerful research and teaching platform, and preserves this content for future generations. JSTOR is part of ITHAKA, a not-for-profit organization that also includes Ithaka S+R and Portico. For more information about JSTOR, please contact support@jstor.org.

From flask E, plate No. 2, there are 60 colonies, among which it is difficult to distinguish between the typhoid and colon colonies.

All the colonies which we replanted from this plate have yielded organisms which produced neither gas nor indol, and which were no longer agglutinated. These organisms were designated as tE6 and cE6.

Flask H, plate No. 2, 200 colonies—150 colon and 50 typhoid.

Characteristics of the two organisms.

Colon bacilli.—Still give the indol reaction and still ferment lactose.

Typhoid bacilli. Preserve their motility, but appear a little more slender. They are no longer agglutinated.

October 26, eighth planting.—The results confirm the former observations:

Flask E.—The number of colonies is reduced to 30 upon plate No. 2. The isolated bacilli are very feeble, and it is only after a series of replantings upon agar that a little vitality can be restored to them. In all cases at this time they give neither indol or gas, and are not agglutinated. These are marked as tE7 and cE7.

Flask H.—The colon bacillus alone remains in this flask, and still gives indol and makes gas, but is very much diminished in number. Plate No. 2 only gives 80 colonies, instead of 150 colonies as at the last planting.

Do colon and typhoid bacilli kept for a long time in laboratories also lose their properties (gas, indol, agglutination) when they are placed under the same conditions as the organisms isolated from stool No. 20?

To satisfy ourselves on this point we employed a colon bacillus from Ghent and a typhoid bacillus from Liége, of which we have been in possession since 1891, and which were procured through the courtesy of Professor Van Ermengem; we followed the same procedure as in experiment I, save that we have employed the neutral solution alone, as that medium only in the former experiment had modified the properties of the bacilli.

Characteristics of the colon and typhoid bacilli before symbiosis.

Bacillus coli.—Energetically ferments lactose gelatin; gives but a feeble indol reaction; is very motile.

Typhoid bacillus.—Is agglutinated by the experimental antityphoid serum in a dilution of 1–80000.

During the first three weeks the colonies of the organisms were very distinct. From this time on the difference became less marked. Further, the typhoid colonies became very rare (2 or 3 typhoid for 100 colon). We then added to the mixture 10 c. c. of a twenty-four-hour-old bouillon culture of the typhoid bacillus Liége, isolated from the flask upon the twenty-first day of the symbiosis. After four months the colon and typhoid bacilli were both living and had preserved their properties—the colon colonies were more numerous than the typhoid.

Is symbiosis necessary to deprive colon and typhoid organisms of their properties?

Experiment III.—Culture of bacillus t. s. 20 in neutral peptone solution.

After one month the bacillus t. s. 20. still preserved its sensibility to the agglutinating properties of the antityphoid serum.

Experiment IV.—After four months the bacillus coli s. 20 still preserved its biochemic properties. The result was the same if after three weeks of symbiosis of bacillus t. s. 20, and bacillus c. s. 20, the latter was allowed to continue to live alone. (See Experiment II.)

Do colon and typhoid bacilli isolated from other typhoid stools always react like the organisms from stool 20?

In order to answer this question we produced symbiosis of the colon and typhoid bacilli from stools 22 and 23. After three months each of the bacilli isolated from these stools preserved their characteristics (indol, gas, agglutination).

The results of the preceding experiments would show that of the 4 Eberth bacilli made use of to study the antagonism between the typhoid and colon bacilli, one only, that of stool 20 has lost its sensibility to agglutinins. We are, therefore, naturally led to ask whether the typhoid bacilli isolated from stool 20, and marked as tE1, tH1, tE2, tH2, etc., and planted on the fifth, sixteenth, and subsequent days of symbiosis (Experiment I), are nonagglutinable typhoid bacilli, or are colon bacilli, which have lost their characteristics (gas, indol, etc.)?

This question is all the more legitimate, as Experiment I showed that bacillus cs20, no longer gave gas or indol toward the third month, while toward the third week certain deep colon colonies had taken on a typhoid appearance. Could it not well be that the colon bacilli had already lost their properties on the fifth day, and that we might have considered these as nonagglutinable typhoid organisms? Were this so, the colon bacillus would have stifled the typhoid bacillus as early as the fifth day, and our experiment would simply and purely have confirmed those of Wathelet and Grimbert on the antagonism between the typhoid and colon bacilli.

Let us say here that for the bacilli isolated from flask H (acid with H_2SO_4 0.5 per 1000) the doubt was not admissible, for in this the colon bacillus preserved its distinctive characteristics (gas, indol, etc.) when the typhoid organism no longer existed in the mixture, or when at least it was no longer discoverable by plates of differential gelatin. The bacilli found in flask E then alone remained under discussion.

Let us remember that they came from small, whitish-blue, deep colonies; that they gave neither gas nor indol, and that they were not agglutinated by the experimental antityphoid serum. Before endeavoring to determine their typhoid or colon origin, it was indispensible, in order to avoid useless researches to be absolutely certain that the typhoid and colon bacilli of stool 20 could really lose their properties (gas, indol, agglutination). The results afforded by Experiment II, previously detailed, enabled us to throw light upon this important question. They practically taught us that the Liége typhoid and Ghent colon bacilli preserved their properties when they underwent symbiosis in neutral peptone solution; it was easy to distinguish them with certainty. We made use of this useful proof to perfect new experiments.

Experiment VII.—Symbiosis of bacillus t. s. 20, and bacillus coli, Ghent (in neutral peptone solution).

Result: After six days the bacillus t. s. 20 had lost its sensibility to agglutinins; the clon bacillus Ghent preserved its indol and gas-producing properties even up to four months.

Experiment VIII.—Symbiosis of bacillus c. s. 20 and bacillus typhoid, Liége (neutral peptone solution).

Result: We proceeded as in Experiment II, and demonstrated that—

First. The bacillus typhoid Liége preserved its property of being agglutinated even up to three months;

Second. That at this time the colon bacillus c. s. 20 no longer gave indol, or could no longer ferment lactose.

These two experiments confirmed the results of the observations in Experiment I. They enabled us to affirm that when we produced symbiosis of typhoid and colon bacilli in neutral peptone solution, of the organisms from stool 20, that the typhoid lost its sensibility to agglutinins on the sixth day, while the colon bacillus is not deprived of its properties of indol and gas production until the third month of symbiosis.

They also afforded proof of the typhoid nature of the bacilli tE1, tE2, tE3, tE4, which were no longer agglutinated, but which were drawn from the mixture before the third month—that is to say, before the colon bacillus had been deprived of its indol and gas characteristics. Finally, they permit us to conclude that the typhoid bacillus lived three months in association with the colon bacillus in a solution containing both organisms.

We have just seen that symbiosis may deprive the typhoid and colon organisms of their distinctive properties. How then can we recognize the typhoid and colon bacillus thus deprived of their differential characteristics?

Characteristics of colon and typhoid bacilli which have lost their distinctive properties.

(*a*) Bacillus coli is larger, shorter, and less motile than the organism from which it is originally derived. After several successive passages through agar, the bacillus planted in bouillon always regains its original form and motility.

(*b*) Bacillus typhoid always notably preserves its form and motility. Old cultures, and even young ones, maintained at a temperature of 37° C., always present a great tendency to the formation of long threads. The cilia are particularly difficult to stain.